

## Global Warming & Pollution Management

6.1.5 Describe and evaluate pollution management strategies to address the issue of global warming.

STOP  
PRODUCING  
POLLUTANT

Mitigation → Preventative Measures

1. **Carbon Trading** - set national limits of carbon.

- Require emitters to pay a fee for every ton of GHG emitted.
- Countries & companies emitting above limit can buy credits.

2. **Cap & Trade** - permits to pollute above a certain level are sold on free market. Those that have "extras" can sell them.

3. **Life Style Changes** - Individual actions such as choice of transport, energy use, consumer goods + services.

4. **Reduce deforestation**

Regulate  
Pollutants at  
Source

- \* CAPTURE CO<sub>2</sub> using carbon capture tech.
- \* ↓ methane emissions with diet/fewer cows.
- \* Replace CFCs
- \* Add iron to oceans to remove CO<sub>2</sub>
- \* Plant more trees/fast-growing plants
- \* Release Atmospheric sulfur (like a volcano)
- \* Small mirrors around Earth

## Clean up & Restoration

↑  
"REACTIVE"

- \* Develop crops that need less  $H_2O$  or deal w/ hotter climates.
- \* More efficient irrigation
- \* Relocate people to new Regions
- \* Stop using flood-susceptible land
- \* Stockpile food
- \* Move nature Reserves to new areas as biomes shift.

## ↓ Important Events in Climate Change

1988	Scientist Dr. James Hansen states that NASA is 99 percent certain that warming is not natural variation but caused by a buildup of carbon dioxide. IPCC established.
1990	First IPCC report concludes warming has happened and is likely to continue
1991	Mt. Pinatubo erupts, releasing aerosols that cool the climate. Sunspot cycle hypothesis proposed by Lassen.
1992	UN Framework Convention on Climate Change founded at Rio de Janeiro in 1992, develops into Kyoto Protocol.
1995	Second IPCC report concludes warming has a human "signature" and declares serious warming to be likely.
1997	Kyoto Protocol sets binding targets for 37 industrialised countries and the European community to cut $CO_2$ emissions by 5% from 1990 levels. Developing countries had differentiated non-binding targets set.
2000	Evidence for sunspot cycle weakens; Lassen concludes they cannot explain warming.
2001	Third IPCC report states a global warming that is unprecedented since the end of the last ice age and is likely to have serious consequences. Global dimming connected to atmospheric pollution, pollution is masking the warming.
2003	Deadly heat waves in Europe
2004	Research analysing 928 abstracts from scientific journals finds no disagreement with the consensus on ACC. (Oreskes, 2004)
2005	Kyoto treaty in effect for major industrial nations except US. Hurricane Katrina spurs debate in America.
2006	Al Gore's <i>An Inconvenient Truth</i> wins public opinion globally. "Hockey stick" climate graph creates controversy and polarises opinion.
2007	Fourth IPCC report finds observed warming is "very likely" due to anthropogenic GHG concentrations. Bali action plan identifies support for adaptation and reducing emission from deforestation and degraded land (REDD) as areas for action.
2009	Warming occurring faster than predicted. Public confidence in scientific consensus and belief in ACC falls. Copenhagen accord recognizes that warming should be kept under $2^{\circ}C$ but fails to reach expectations to provide an effective extension of Kyoto.
2010	Cancun climate discussions revive optimism in the process but reach no conclusions on a new protocol. The work of 1,372 climate researchers and their publications screened; 97-98% of researchers support ACC. (Anderegg, Harold, Schneider, & Prall, 2010)
2014	Fifth IPCC report is planned to focus on the role of renewable energy sources in mitigation and risk management for adaptation.

IPCC Report

Kyoto Protocol

Copenhagen



# EVALUATING POLLUTION MANAGEMENT & GLOBAL WARMING

+ 's

- Some methods don't req. international cooperation
- To keep Earth  $< 2^{\circ}\text{C}$  of warming  $\rightarrow$   $\text{CO}_2$  levels must be kept pretty low  
 $\rightarrow$  80% Reduction in emissions.
- international agreements affect a lot of people.

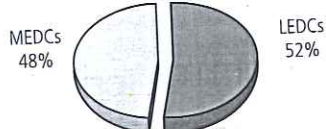
Success of  
Kyoto + similar  
laws depends on

- \* Will governments sign up for agreements?
- \* are governments preventive OR reactive

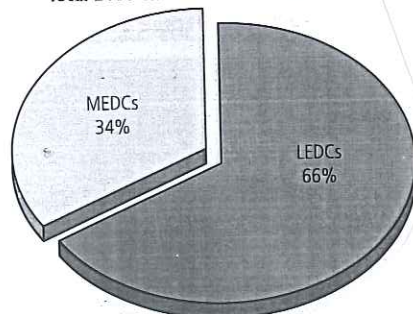
Total 1990 emissions: 6 billion tons



Total 2015 emissions: 8.45 billion tons



Total 2100 emissions: 19.8 billion tons



- many policies aren't taking into account changing LEDC  $\text{CO}_2$  production

- 's

- Concern about diff./fairness btw. MEDC's & LEDC's.
- Countries may not sign voluntary agreements (like Kyoto)
- Cost to development
- Carbon storage is not well understood & is hard to predict / manage.
- few individuals want to be "no impact man"
- simulated volcanic activity is unpredictable
- Cloud seeding could  $\uparrow$  greenhouse effect.
- estimating carbon storage in forests/oceans depends on their future availability.
- CARBON taxes - Countries that have them have seen their carbon drop (as in the UK) - but most countries don't have them.
- Carbon Trading - the targets may be too generous. the system isn't working very well
- Carbon offsets - give people a way to offset their carbon production But don't make people change life styles.